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ABSTRACT

E-mentoring is the merger of mentoring with electronic communications and has been termed telementoring, cybermentoring, or virtual mentoring. By leveraging the growth in information technology, electronic mentoring provides opportunities for mentoring prohibited by face-to-face mentoring programs. Yet, the ease with which e-mentoring programs can be developed may belie the planning, administration, and resources required to make them successful. Because of the physical distance between program developers and participants, the temptation is great to match mentors with proteges but then provide little in the way of coaching, training, and follow-up. This paper defines e-mentoring and structured e-mentoring programs, identifies their promise, and highlights some potential pitfalls. It then suggests a model for conducting structured mentoring programs and applies this model to the e-mentoring format. In the process of applying this model, open research questions that pertain to e-mentoring are identified. (Contains 18 references.) (Author/AEF)

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Electronic Mentoring:

Issues to Advance Research and Practice

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and

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MentorNet

Paper presented at the

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Abstract

E-mentoring is the merger of mentoring with electronic communications and has been termed telementoring, cybermentoring, or virtual mentoring. By leveraging the growth in information technology, electronic mentoring provides opportunities for mentoring prohibited by face-to-face mentoring programs (Muller, 1997). Yet, the ease with which e-mentoring programs can be developed may belie the planning, administration, and resources required to make them successful (Education Development Center, 1998). Because of the physical distance between program developers and participants, the temptation is great to match mentors with protégés but then provide little in the way of coaching, training, and follow-up.

In this paper, we define e-mentoring and structured e-mentoring programs, identify their promise and highlight some potential pitfalls. Then we suggest a model for conducting structured mentoring programs and apply this model to the e-mentoring format. In the process of applying this model to the e-mentoring format, we identify open research questions pertaining to e-mentoring. We hope that practitioners involved in conducting e-mentoring programs benefit from our insights and that e-mentoring programs will deliver the expected benefits.[1] We also encourage applied researchers to address the research issues we identify, thereby increasing our understanding of and ability to implement successful e-mentoring programs.

[1] We realize that all too often important support programs, such as mentoring programs, operate with fewer resources than required. Under these circumstances, our desire is that the recommendations of this paper will not prove burdensome but may help facilitate the most effective utilization of the available resources.

Electronic Mentoring: Issues to Advance Research and Practice

Definition of E-mentoring and Structured E-mentoring

E-mentoring is a naturally occurring relationship or a paired relationship within a program that is established between a more senior individual (mentor) and a lesser skilled or experienced individual (protégé), primarily using electronic communications, and is intended to develop and grow the skills, knowledge, confidence, and cultural understanding of the lesser skilled individual to help him or her succeed. Structured e-mentoring is e-mentoring that occurs within a formalized program environment, provides training, coaching, and structure to increase the likelihood of engagement in the e-mentoring process, evaluates the results of the program to determine the impact on the participants, and identifies improvements for future programs. Within this framework, e-mentoring programs vary in their program formats and target populations.

Advantages of E-mentoring

E-mentoring is the fortuitous merger of mentoring with electronic communications, made possible by the increased availability of electronic communications on college campuses (Guernsey, 1997) and in the workplace. Electronic communications provide a flexible communication environment independent of time and space, allowing for asynchronous exchanges, thus making them an ideal medium for mentoring (Steinberg, 1992). Since failure to meet based on time and space constraints has doomed more mentoring relationships than any other factor (Noe, 1988), the asynchronous nature of e-mentoring alleviates this obstacle to the development of mentoring relationships. The flexible communication environment allows those housed outside of the college campus to mentor students. Alumni/ae and professionals who do not have the time to meet a student face-to-face for a brief mentoring meeting can readily provide advice, suggestions, and support to students while sitting at their desks or workstations. Therefore, e-mentoring can extend mentoring opportunities to many more students and will allow mentors to participate who otherwise would find the time investment prohibitive (Muller, 1997).

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E-mentoring also profits from the unique communication qualities associated with electronic communications, which possess qualities that support the development of open, supportive relationships. Electronic communications result in the attenuation of status differences by concealing social cues that otherwise hinder communication between higher status groups and lower status groups (Sproull and Kiesler, 1992). In addition, communicating using e-mail allows for the construction of thoughtfully written messages without the pressure of immediately responding, such as in communicating orally.

Potential Drawbacks of E-mentoring

E-mentoring holds much promise for higher education. Amidst this promise, we offer a note of caution. Early in its establishment, and too often today, the face-to-face mentoring movement faced disappointing results. Mentoring programs were initiated with good intentions but without adequate planning (Freedman, 1992). Mentoring programs failed as they matched mentors with protégés but provided little in the way of structure, mentor training, and follow-up. Without high level of program structure, protégés caught up in busyness failed to follow through on commitments (Boice, 1990; 1993); mentors never invested the time or energy to provide worthwhile support and encouragement to protégés (Dickey, 1997). These mentoring programs too often fell far short of the program goals and the expected benefits of mentoring.

Practitioners and researchers quickly realized that training, coaching, and follow-up for the mentoring program participants were required to extend the benefits of mentoring to a broader population of newcomers. With the proper program structure, involvement within the mentoring programs improve, the benefits associated with structured mentoring programs increase (Murray, 1991).

Some qualities of electronic communications may make it even more important to provide program structure for e-mentoring programs than for face-to-face mentoring programs. The tendency to match e-mentoring pairs without the necessary structure and follow-up will be as, if not more, tempting compared with traditional mentoring programs. Contact among program staff and participants could be minimal, making it easy to overlook the necessity of creating a structured format to sustain regular interactions

between mentors and protégés throughout the program duration. Thus, the provision of mentor training, pair coaching, and regular contact with program developers may be even more crucial within an e-mentoring format than with in a face-to-face mentoring format.

We hope to spare e-mentoring some of the early failures experienced by the mentoring community. For the remainder of this paper, we introduce the model of structured mentoring, then, due to space limitations, describe the most salient applications of the model to the structured e-mentoring process. We hope this exercise will assist in the planning and implementation of future e-mentoring programs and will prompt and guide future research into e-mentoring. Were appropriate, we use examples from MentorNet[2], a nation-wide electronic mentoring program.

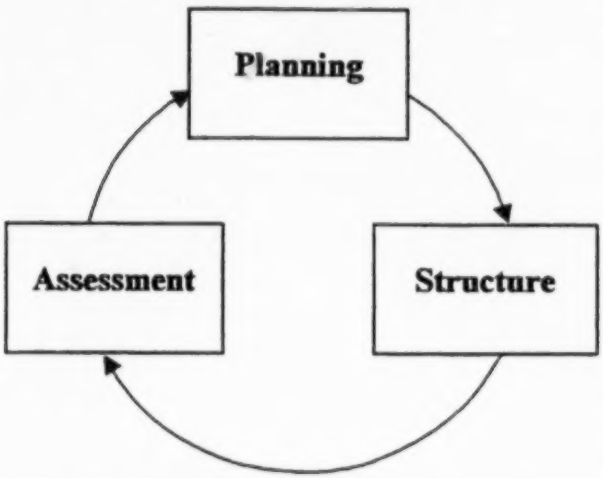

Figure 1: The Model of Structured Mentoring

The Model of Structured Mentoring

We developed the Model of Structured Mentoring (Figure 1) by identifying and incorporating the essential elements of successful structured mentoring programs. This simple, iterative model developed out of our experience conducting and researching the structured mentoring process, was informed by knowledge of the mentoring literature, and evolved from an earlier model (Boyle and Boice, 1998b). Although developed within a higher education context, the Model of Structured Mentoring can be adapted to a variety of mentoring programs because the model incorporates the fundamental elements for conducting a structured mentoring program.

The model begins with Planning, moves to Structure, and ends with Assessment, directing a structured mentoring program from inception, through implementation, and finishing with program

[2] In 1998-99, MentorNet paired over 500 women students in the engineering and science fields with industry professionals and supported them through a year-long e-mentoring relationship.
For more information about MentorNet, visit www.mentornet.net.

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evaluation. The three elements of the model are connected by three curved lines, which combine to form a circle and indicate the iterative nature of the model.

Planning

The planning phase spans from the time program developers identify the program population and goals[3] through the launching of the mentoring pairs. Planning lays the foundation that will aid in the success of the individual e-mentoring pairs, and thus, the e-mentoring program as a whole. The overall goal of the planning phase is to ensure that the participants are aligned with the program goals and objectives.

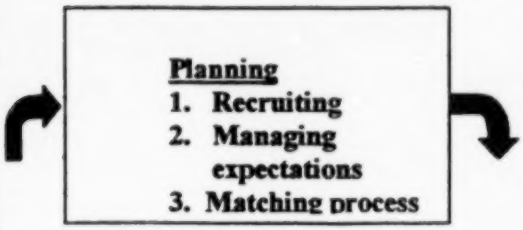

Figure 2: The Planning Phase

Recruitment. Recruitment is the process by which potential mentors and protégés are notified of the e-mentoring opportunity. Adequate planning can strengthen the recruitment by addressing how to recruit, when to recruit, and potential obstacles to recruiting the target mentor and protégé populations.

Since e-mentoring relies on e-mail, the recruitment process can use electronic communications. Therefore, recruiting within a single organization with a centralized communications infrastructure can be quite simple. A well networked university or college that already has distribution lists set up by different group characteristics, such as lists for women students enrolled in engineering, can make recruitment as simple as sending out well-crafted recruitment messages using e-mail. While using electronic communications to recruit can make easy work of this stage, we do not suggest wholly relying on this medium. Strategically placed posters and presentations at appropriate meetings (such as, student chapters of professional and honor societies) can aid in the recruitment process.

More often than not, the increased opportunities and connections made possible by e-mentoring allows mentors and protégés from multiple organizations and geographical locations to get involved. In these instances, the program coordinator may want to identify partnering organizations and recruit

organizational representatives who will be willing to recruit within their organizations. The advantage of having representatives for each involved organization is that the representatives will have access to the organizations' communication infrastructures and they will know the organizational cultures, which will influence the recruiting techniques.

On the web site, program developers could post one application form for protégés and the other for mentors. The application data can be automatically dumped into a database, thus alleviating the need for a time consuming and error-prone data entry step. Depending on the goals of the mentoring program, the information gathered can be personal or academic/professional characteristics, preferences for an e-mentoring partner, and perceived needs of the participants.

Managing expectations. Managing expectations include communicating the program goals, eligibility criteria, and frequency of expected contact in the recruitment materials to the target mentor and protégé populations. The goal of this step is to clarify and make explicit the program goals.

To ensure that prospective mentors and protégés read and agree to the expectations, a Participant Guideline can be developed and posted on the program web site. Mentors and protégés could be required to read and agree to the participant guidelines before they can have access to the application. This agreement can be stated clearly on the bottom of the participant guidelines along with a check box or with a link. When the participant agree to the guidelines by clicking on the link or checking the check box, then they will be allowed to have access to the web based application.

Matching processes. Since the match is the foundation of the mentoring relationship, careful consideration should be given to the method by which e-mentors are paired with protégés. The matching process is even more important in e-mentoring settings than in face-to-face mentoring settings. Why? In face-to-face mentoring settings, the participants usually share membership in a university or college, therefore they already share many experiences. In fact, a large part of the face-to-face mentoring relationship can be developed around helping the protégé understand the culture of a new organization. Since e-

[3] We assume the requisite staff have already been hired or assigned to the program.

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mentoring can occur between mentors and protégés who share little, if any, organizational membership or inherently shared characteristics, it may be all the more important to carefully match e-mentoring pairs.

There are various methods for matching dyads or groups of mentors and protégés. An important feature of the matching process is to let mentors and protégés know by what process they will be matched, this information can be included on the web site. Below we will briefly describe three different methods for matching e-mentoring pairs. One method for matching mentors with protégés is to list names and biographical descriptions of mentors on a web site. Then, interested protégés can review the information associated with the mentors. The descriptions of protégés can also be listed on the web site for the mentors to review and chose e-mentoring partners. For confidentiality reasons, to launch a mentoring pair, the interested party would contact the program developer, who would forward a message to the mentor (or protégé) whose biography was posted. A second method is uni-directional matching. In this instance and as part of the application process, one of the two mentoring partners would identify preferences for a mentor. Typically the protégés would identify preferences and the program developer matches protégés' preferences with e-mentors characteristics and interests. These preferences can be based on mentor's professional characteristics (i.e., position or field), personal characteristics (i.e., ethnicity, gender), or professional needs of the protégé (i.e., support in pursuing a major, pre-professional career tips). A final method is the bi-directional matching protocol. Rather than only matching the interests and preferences of one of the two partners with the characteristics of the other, this method takes into account the interests and preferences of *both* the mentors and the students. This method increases the difficulty of the matching protocol. With a small numbers of mentoring pairs, hand-matching is feasible, and possibly most efficient. To perform a bi-directional preference based matching protocol effectively for a large-sized e-mentoring program, we suggest development of an automated matching system.[4]

Whichever matching protocol is chosen, an important consideration is to obtain buy-in on the part of both e-mentoring partners for the match. After completing the matches, we suggest sending the participants

information about their e-mentoring partners, without identifying or contact information. Both the protégés and the e-mentors will have to decide to accept or reject the match. This step allows the prospective mentoring pairs to feel ownership over the mentoring relationship, thus facilitating the establishment of the e-mentoring relationship. In addition, it serves to weed out those who originally signed up for the program but who are not able to follow through based on lack of interest, technological difficulties (i.e., e-mail address and server problems), and schedule changes.

Research questions. Since e-mentoring is in its infancy, many research questions remain to be answered. As e-mentoring increases, and the recruiting efforts aimed at e-mentors need to be increased, we could do well to examine what motivates e-mentors to volunteer for such programs (Single, Jaffe, and Schwartz, 1999). In this way, we can develop recruiting materials aimed at effectively recruiting e-mentors. Research questions pertaining to planning focus on the best way to match mentoring pairs or groups and how the matching process influences the mentoring outcomes. Addressing these research questions will allow us to more effectively recruit and pair e-mentoring participants.

Structure

Structure (see Figure 3) is perhaps the most important, and most overlooked, element of a mentoring program. In addition, it is the most time consuming element of the process and can take up the majority of program coordinators' time. Structure includes the training, coaching, and community-building that helps participants make the most of the mentoring experience. The content of the training, coaching, and community building elements will be driven by the program goals and target populations.

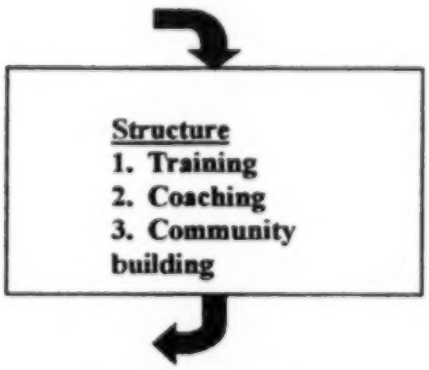

Figure 3: The Structure Phase

Training. For e-mentoring programs, training can focus on introducing issues relevant to the target population

[4] MentorNet has developed a bi-directional matching protocol using visual basic to sort through the mentor and student-protégé pools.

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and general mentoring issues, such as enculturation issues (Boyle and Boice, 1998a). It also can provide suggestions for initiating and developing *on-line* mentoring relationships. The goal of the training is to equip the e-mentors to be flexible about their expectations for the protégés, and to learn how to assess and respond to the needs of their protégés, rather than imposing personal expectations on the protégés (Single, Muller, and Inoue, 1999).

One form of electronically supported training is moderated discussion groups (Education Development Center, 1997) and would work best with smaller-sized e-mentoring programs. Another form of electronically supported training is a web based training tutorial. This type of training is much more intensive to set up, yet is much more scaleable and recommended for large sized e-mentoring programs. Much like the tutorials developed for introducing users to new software, this is an interactive tutorial. Multiple mentoring participants can access the web based training tutorial simultaneously and at their convenience. Such a tutorial would introduce prospective e-mentors to an appropriate case study for the protégé population, then allow the e-mentors to provide an hypothetical response. Next, the e-mentors would be guided through sample responses. These sample responses could address initiation of the mentoring relationship, could bring up some issues particularly relevant to the target protégé population, and could be annotated to highlight the benefits or deficiencies of various responses. A similar tutorial could be developed for protégés. Completing this tutorial could be a pre-requisite for being matched in an e-mentoring relationship, and may serve to weed out those not ready to invest the time and energy required to make an e-mentoring relationship successful.

Coaching. Coaching is different from training. Where training occurs at the onset of a program and is an intensive process, coaching occurs throughout the program. The coaching messages are discussion suggestions or mentoring tips that are appropriate for the program goals and audience. The coaching messages are short e-mail messages, typically that the recipient can read without having to scroll down the screen, and are sent weekly or every other week. Separate messages could be tailored for and sent to the mentor and protégé populations.

Coaching messages in an e-mentoring setting serve multiple purposes. First, they provide incentives for the mentors and protégés to stay in contact (Boice, 1992). If the e-mail exchanges have lagged, then the coaching prompts provide a nice opportunity to start up the exchanges again. Second, they coach the e-mentoring pairs along the phases of the mentoring relationship: initiation; cultivation; and, separation (Kram, 1983). Third, the coaching messages can contain additional resources for the participants. Each message can also refer to a web based resource that contains information about the suggested discussion topic. Fourth and finally, the coaching allows the program developer to stay in contact with the individuals in the e-mentoring relationship. In this way, it allows the program coordinator to consult as needed.

Community building. For participants of face-to-face structured mentoring programs, group meetings appear to be widely beneficial and highly rated by the participants (Boyle and Boice, 1998b). These meetings gave them a sense of involvement with the full program and with their organization or field as a whole. Electronic discussion lists could be set up and the participants could be invited to subscribe. The lists could focus on issues pertinent to the target populations (i.e., Women's Issues) or could center on characteristics of the participants (i.e., Electrical engineering students and their mentors).

Issues and research ideas. There are multiple open research questions associated with the structure phase. First, we still need to determine the most effective and efficient methods for training delivery, and whether the optimal training delivery methods are depending on the type and the size of the mentor and protégé populations. A second research issue has to do with the delivery, frequency, and content of the coaching messages. Finally, what types of community building forums are most useful? Research into these questions will help improve the structure that e-mentoring programs provide.

Assessment

Assessment helps to measure the value associated with the program. With e-mentoring being in its infancy, there is the necessity of performing research, assessment, and evaluation to identify best practices associated with conducting e-mentoring programs. While assessment is placed last in the Model of

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Structured Mentoring, it should be considered throughout the development and implementation of the program.

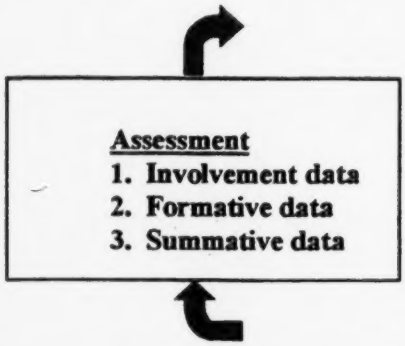

Figure 4: The Assessment Phase

Using electronic communications, there are two modes for collecting assessment data. The first way is via e-mail. Surveys and structured interviews could be formatted for and sent via e-mail to the mentors and the protégés. If this method is used, it is important to format for the short width of e-mail messages, otherwise the rating scale may become distorted and the actual answers of the participants may become unclear. The web could also be used to deliver assessment instruments. In this instance, participants would be sent an e-mail asking them to fill out a survey, with a URL directly them to the web page where the survey is housed. This method alleviates the need to format the survey for a fickle e-mail environment. In addition, since the web-based survey answers can be dumped directly into a database, data entry is automated. Within the goals of the assessment phase, and the different electronic methods of data collection, three types of data are beneficial: involvement data; formative data; and, summative data, as can be seen in Figure 4.

Involvement data. Participant involvement data indicate whether participants are complying with program guidelines. The level of participant involvement appears dependent on the program structure and follow-up. By collecting these types of data, program elements can be evaluated with suggestions for improving future programs. In addition, collecting such data allows benchmarks to be measured; involvement rates from, for instance, a pilot program could serve as the initial benchmark and future programs would strive to improve on future participant involvement.

Formative data. Along with collecting participant involvement data, collecting formative data is also advantageous. Reviewing this data allows program developers to understand how well each pair bonded, thus establishing predictors of good mentoring and of good mentors. The data can be collected using self-reports – requesting participants to fill out journals for face-to-face mentoring programs work well;

requesting participants to answer short questions e-mailed to e-mentoring participants also work well. By collecting content of mentoring interaction data, program developers can learn what topics the participants are discussing, thus develop effective training and coaching for future participants. The participants often provide the best suggestions for improving the program. Direct questions about what e-mentoring participants perceived as valuable and invaluable aspects of the e-mentoring program can provide a rich source for improving and streamlining the program.

Summative data. Summative analysis focused on the outcomes associated with participating in the program. This type of analysis most directly speaks to the sustainability issue and should be conceived of with stakeholders in mind. Summative data can be collected at the end of the program and ask participants to rate how much they learned from participation, or how their attitudes and behaviors changed due to participation. In addition, summative data could include administering relevant pre- and post-tests to the participants and measuring their change scores due to participating in the program.

Research questions. Very few mentoring programs have 100% compliance and involvement on the part of the participants, except with fairly intensive intervention on the part of the program coordinator. With e-mentoring programs, the numbers involved in the program and the distance from the program coordinators will probably ensure that the likelihood of reaching 100% compliance is even less likely than in face-to-face mentoring programs. Therefore, a central research question regarding assessment is benchmark data concerning participant involvement in an e-mentoring program.

In addition, the method of delivery for the assessment instruments may influence the response rates. Therefore, another open issues regarding assessment is determining the comparative response rates for e-mail delivered instruments versus web-based instruments.

Discussion

E-mentoring provides a new medium for mentoring, allowing additional mentors and protégés to participate in mentoring programs where participation in a face-to-face program would be difficult or impossible. E-mentoring offers unexpected benefits, the ease of communication within a networked

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environment can help facilitate the establishment and development of the e-mentoring relationships. To aid in the development of effective e-mentoring programs, attention to programmatic issues can increase the benefits associated with participation. By raising pertinent issues through the application of the Model of Structured Mentoring to the e-mentoring process, we hope to assist in the planning and implementation of future e-mentoring programs and to prompt and guide future research into e-mentoring.

References

Boice, R. (1990). Mentoring new faculty: A program for implementation. Journal of Staff, Program, and Organizational Development, 8, 143-160.

Boice, R. (1992). Lessons learned about mentoring. In M.D. Sorcinelli & A. E. Austin (Eds.), Developing new and junior faculty, New directions for teaching and learning: No. 50. (pp. 51-61). San Francisco: Jossey-Bass.

Boice, R. (1993). New faculty involvement for women and minorities. Research in Higher Education, 34, 291-341.

Boyle, P. & Boice, R. (1998a). Best practices for enculturation: Collegiality, mentoring, and coaching. In M. S. Anderson (Ed.), New Directions in Higher Education, 101. San Francisco: Jossey-Bass.

Boyle, P. & Boice, R. (1998b). Systematic mentoring for new faculty teachers and graduate teaching assistants. Innovative Higher Education, 22, 157-179.

Dickey, C. A. (1997). Mentoring women of color at the University of Minnesota: Challenges for organizational transformation. The Journal for Vocational Special Needs Education, 19, 73-77.

Education Development Center. (1997). Guide to On-line Telementor Training. New York: Author.

Education Development Center. (1998). Critical Issues in the Design & Implementation of Telementoring Environments. New York: Author.

Freedman, M. (1992). The kindness of strangers: Reflections on the mentoring movement. Philadelphia, PA: Public/Private Ventures.

Guernsey, L. (1997, Oct. 17). E-mail is now used in a third of college courses, survey finds. The Chronicle of Higher Education, 44, p. A30.

Kram, K. E. (1983). Phases of the mentor relationship. Academy of Management Journal, 26, 608-25.

BEST COPY AVAILABLE

Muller, C. B. (1997, Nov.). The potential of industrial "e-mentoring" as a retention strategy for women in science and engineering. In Proceedings of the Annual Frontiers in Education (FIE) Conference. (http://www.engmg.pitt.edu/~fie97).

Murray, M. (1991). Beyond the myths and magic of mentoring. San Francisco: Jossey-Bass.

Noe, R. A. (1988). An investigation of the determinants of successful assigned mentoring relationships. Personnel Psychology, 41, 457-479.

Single, P. B., Jaffe, A., & Schwartz, R. (1999). Evaluating programs for recruiting and retaining community faculty. Family Medicine, 31(2), 114-21.

Single, P. B., Muller, C. B., & Inoue, K. (1999, Nov.). Industry Professionals as Mentors: A Model to Guide Mentor Training. Paper to be presented at the Frontiers in Education Conference, San Juan, Puerto Rico.

Sproull, L. & Kiesler, S. (1992). Connections: New ways of working in the networked organization. Cambridge, MA: The MIT Press.

Steinberg, E. R. (1992). The potential of computer-based telecommunications for instruction. Journal of Computer-Based Instruction, 19, 42-46.

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